REMARKS

Summary Of The Office Action

Claims 20-38 pending.

Claims 20-31 and 36-38 have been rejected under 35 U.S.C. § 103(a) as obvious from Barton in view of Carr et al. U.S. Patent No. 5,011,520 ("Carr"). Claims 32-35 have been rejected under 35 U.S.C. § 103(a) as obvious from Barton and Carr in view of Wofford et al. U.S. Patent No. 5,011,520 ("Wofford").

Applicants' Reply

Applicants' traverse the prior art rejections.

Applicants have amended claims 20 and 39 to clarify issues. Applicants' respectfully request entry of the claim amendments.

Applicants resubmit the Remarks section presented in the previous Reply dated July 28, 2005, January 9, 2006 and April 25, 2006. For brevity, the Remarks sections of the previous Replies is not reproduced verbatim in their entireties, but are incorporated by reference herein in their entireties. Applicants respectfully request reconsideration of those Remarks.

Applicants here submit the following additional remarks.

Applicants' invention is related to a waste gas cleaning system for removing harmful and/or toxic gases from a gas stream. According to claim 1, the inventive waste gas system includes:

a reaction chamber for removing harmful and/or toxic gases, said reaction chamber having an inlet for receiving a gas stream to be treated and an outlet;

a plasma source coupled to said reaction chamber for providing excitation energy to said reaction chamber for removing harmful and/or toxic gases and form a plasma therein; and

a liquid jet pump having a suction port connected to said reaction chamber outlet and generating negative pressure in said reaction chamber for generating a plasma therein, said liquid jet pump being arranged to draw treated gases jet pump being arranged to draw treated gases namely gases having harmful and/or toxic gases removed thereform out of said reaction chamber mixed with liquid from said liquid jet.

According to claim 39, the liquid jet pump in the waste gas cleaning system of claim 1 is "further arranged to generate a negative pressure in said reaction chamber for ignition of said plasma and to further arranged to maintain said negative pressure during plasma treatment of the received gas stream for removing harmful and/or toxic gases therefrom."

Applicants respectfully submit that the waste cleaning systems of claims 20 and 39 are not shown, taught or suggested by the cited prior art.

As previously noted as commonly understood in the art, liquid jet pumps (e.g., Fig. 1, pump 3) operate on the so-called Venturi effect, involve constricting fluid flow to create suction in the constricted region. The Venturi effect requires not only fluid flow (at any pressure) but also a constricted region in the flow path, which leads to a pressure drop in the constricted region. After the constricted region, for example, in a flared Venturi tube, the fluid pressure returns to its original value. The constricted region having lower pressure is connected via a suction tube or port (e.g., Fig. 1, suction port 21) to another chamber to provide vacuum drawing power or suction on the chamber.

Applicants further note that as known in the art the "suction port" 21 is perpendicular to the fluid flow in the constricted region as shown in FIG. 1 See e.g., www.mse.ncsu.edu/WideBandgaps/classes/MSE%20751/PumpSeminars/02_Venturi.ppt (copy attached).

§ 103(a) rejections

As previously submitted, Barton does not disclose or suggest a liquid jet pump to suction a reaction chamber. Further, as previously noted spray nozzles 94 are configured to atomize liquid but not to create "suction" on the reaction chamber. In fact, a person of ordinary skill in the art would read Barton as teaching away from the use of liquid jet pumps for Barton provides a mechanical pumps (e.g., induction/suction fan 20, variable speed waste feed pump 74, etc.) for moving waste gases and products (See e.g., col. 6 lines 31-37).

Accordingly claim 20. which requires a "reaction chamber for removing harmful and/or toxic gases" and "a liquid jet pump having a suction port connected to said reaction chamber outlet and generating negative pressure in said reaction chamber for generating a plasma therein," is neither anticipated nor obvious from Barton. Likewise claim 39, which has limitations similar to claim 1, is neither anticipated nor obvious from Barton.

Further, claims 20 and 39 are not obvious even when Barton is viewed together with Carr.

Carr, as previously noted, merely describes a hydrodynamic fume scrubber, i.e. a water scrubber. (See e.g., FIGS 1-10). As correctly noted by the Examiner, Carr describes "a negative pressure suction stage (20) . . . to draw the gaseous effluent into the main scrubbing

chamber 22." (See Office Action February 3, 2006 section 2 page 3 lines 5 -12, citing Carr FIG. 5 and col. 8 lines 35-43).

The present Office Action states: (1) Carr's reaction process 16 is a reaction chamber. (See Office Action page 5- 6).

Further, the present Office Action citing Carr col. 8 lines 34-35 states: (2) " The inside surface 90 of the structure 84 converges to form a venturi. Carr discloses the spray action, together with low constriction 90, is adjusted to create suction sufficient to draw the gaseous effluent into the main scrubbing chamber 22 and simultaneously intimately to mix the effluent with the scrubbing liquid (Col. 8, lines 35-43). Such configuration constitutes a liquid jet pump of the claimed invention." (See Office Action page 5- 6).

Further, the present Office Action concludes (3): "Thus, it would have been obvious in view of Carr to one having ordinary skill in the art to modify the apparatus of Barton with a liquid jet pump as taught by Carr in order to promote intermixing between the gas and scrubbing liquid and maintain a negative pressure in the scrubber system." (See Office Action page 5- 6).

Applicants respectfully submit that each of the three statements or interpretations of Carr in the present Office Action are incorrect. Further, even if they correct, they do not describe applicants' claimed elements.

(1) Applicants note that Carr's scrubbing main chamber 22 is described by Carr as the reaction chamber for scrubbing (i.e. removal of toxic or waste materials) of a gas stream.

Applicants respectfully submit that the Examiner mistakenly corresponds Carr's reaction process 12 with "a reaction chamber," and in particular with "a reaction chamber for removing harmful and/or toxic gases" as required by applicants' claims 20 and 39. Carr's reaction process

12 is the source of a waste gas stream which needs to be cleaned and not a waste cleaning system reaction chamber (See e.g., Carr col. 5 lines 40-43 "reaction process 12 generates and emits a gaseous effluent stream which is heavily laden with siliceous particulates.")

(2) Applicants respectfully submit that Carr's configuration does not constitutes a liquid jet pump of the claimed invention.

Applicants note that Carr's venturi arrangement (col. 8, lines 35-43: "the inside surface 90 of the structure 84 converges to form a venturi, " and FIG. 5) is co-axial with the gas stream flow. This is in contrast with applicants' liquid jet pump in which the suction port (claimed in claims 20 and 39 (as connected to the outlet of waste treatment reaction chamber) is perpendicular to the flow in the constricted region of the venturi. (See Fig. 1).

Carr's venturi (as correctly noted by the Examiner) "create[s] suction sufficient to draw the gaseous effluent into the main scrubbing chamber 22 and simultaneously intimately to mix the effluent with the scrubbing liquid." Applicants respectfully submit that a person of ordinary skill in the art would understand that Carr is only disclosing mixing the scrubbing liquid with effluent gases coming from inlet device 18 [in negative pressure stage 20] and at most draw the gaseous effluent into downstream the main scrubbing chamber 22. Carr's co-axial Venturi orientation is contrary to applicants' perpendicular liquid jet pump arrangement (FIG. 1) and does not create sufficient suction to draw from an upstream reaction chamber (or process 12) via conduit 14. Applicants, in particular, note that there is no teaching or suggestion in Carr of a liquid pump jet arrangement "of generating negative pressure in said [waste treatment] reaction chamber for generating a plasma therein" as required by claim 20, and "further arranged to

maintain said negative pressure during plasma treatment of the received gas stream for removing harmful and/or toxic gases therefrom," as required by claim 39.

Thus, Carr like Barton does not to show, teach or suggest using a liquid jet pump located at the outlet of a plasma [waste treatment] reaction chamber to draw waste or treated gases out of the plasma processing reaction chamber. Therefore, claims 20 and 39 are patentable over the cited references – Barton and Carr, whether they are viewed individually or in combination.

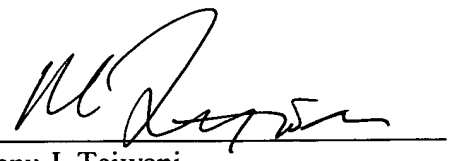
Dependent claims 21-38

Dependent claims 21-38 are patentable over the cited references – Barton and Carr, for at least the same reasons that parent claim 20 is patentable over these references.

Conclusion

Applicants respectfully submit that this application is now in condition for allowance. Reconsideration and prompt allowance of which are requested.

Applicant respectfully requests that the Examiner should kindly contact the undersigned attorney for a telephone interview to discuss the claim amendments.

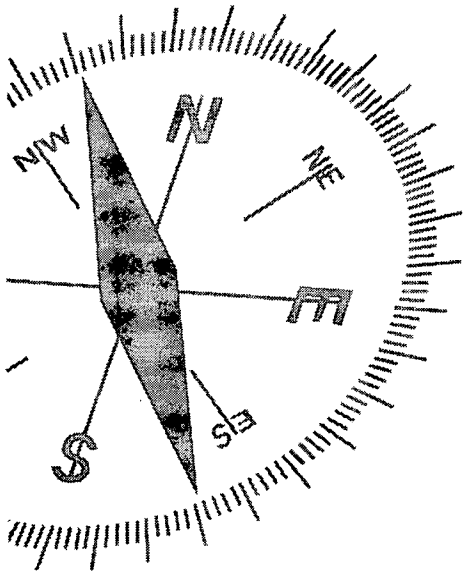
By: 

Manu J. Tejwani
Patent Office Reg. No. 37,952

Attorneys for Applicants
212-408-2614
Baker Botts L.L.P.
30 Rockefeller Plaza
New York NY 10112

Venturi Pumps

Jeremy Gobien



Copy of reference
cited on page 8 of Report

How the Venturi Pump Works:

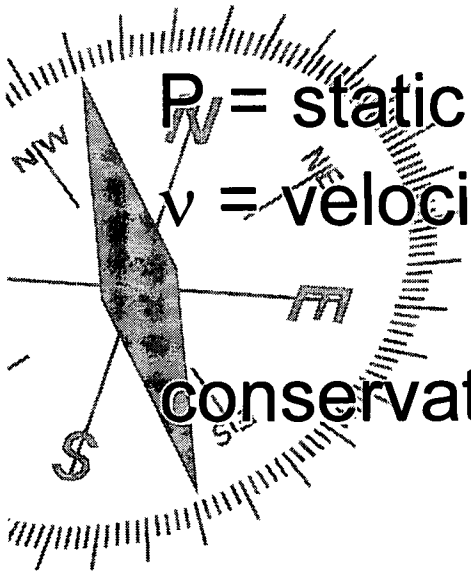
Johann Bernoulli (1700-1782)

- swiss mathematician
- famous for work on kinetic theory of gasses, proposing that gas properties could be explained by particle motion
- formulated "**Bernoulli Principle**"
    * As fluid velocity increases, pressure decreases

How the Venturi Pump Works:

Bernoulli's Principle: describes fluid behavior for varying flow (and height) conditions

$$P + 1/2\rho v^2 + \rho gh = \text{Constant}$$

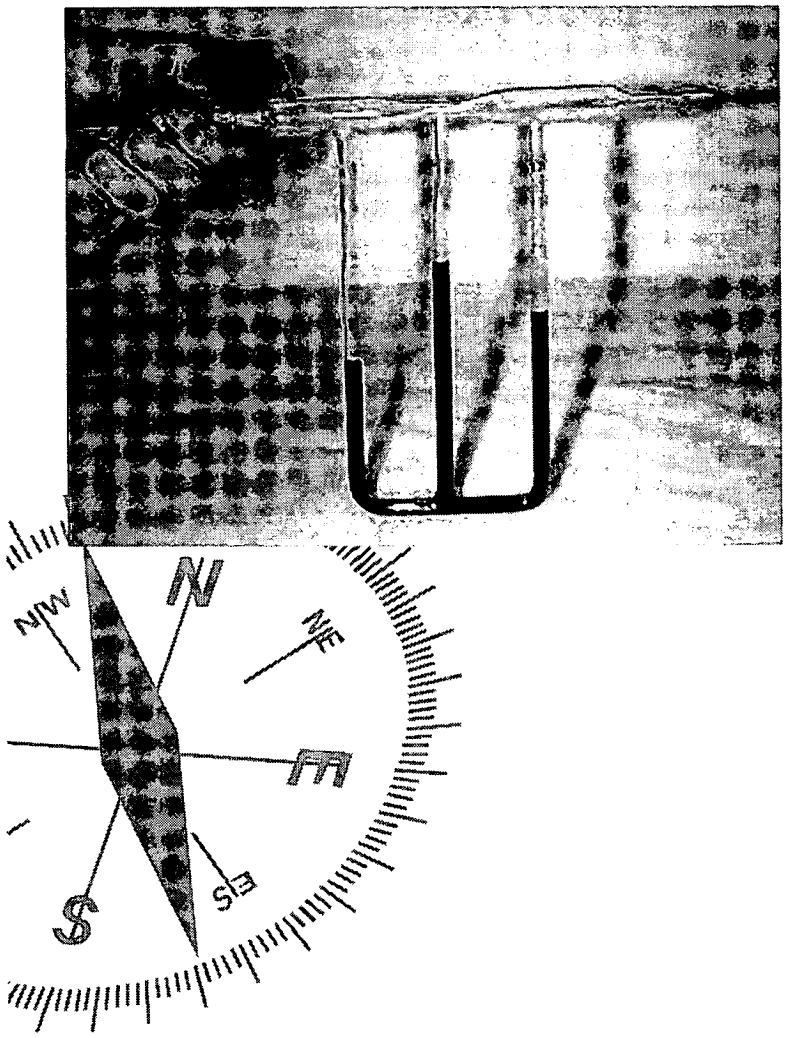


P = static pressure, ρ = fluid density,

v = velocity

conservation of energy for fluid mechanics

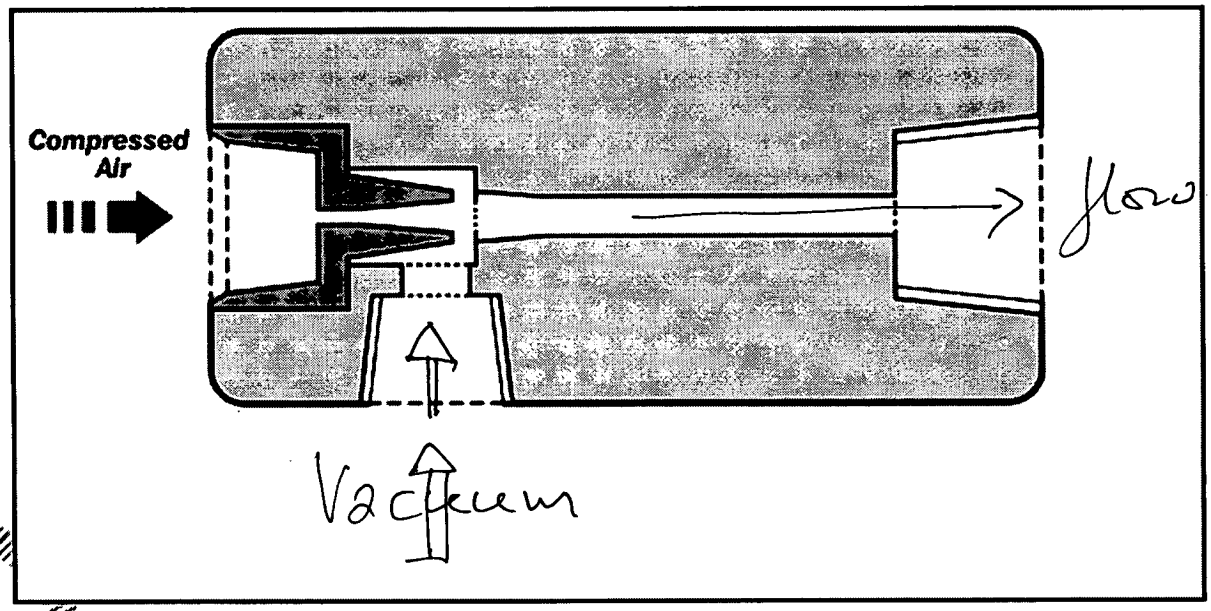
How the Venturi Pump Works:

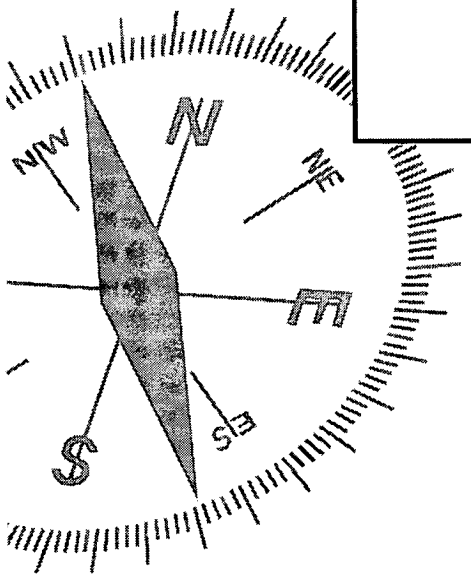


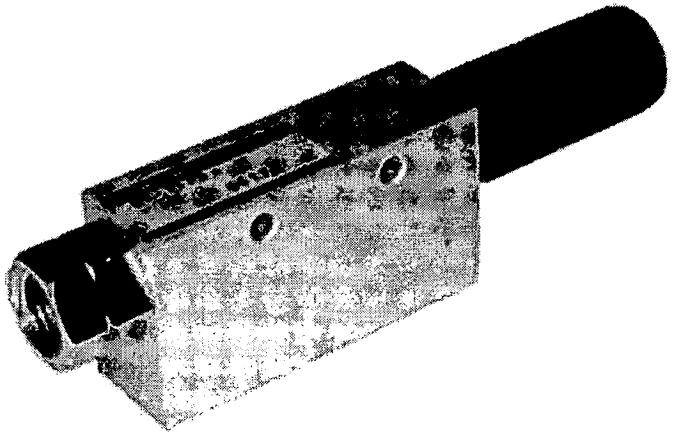
An Italian contemporary of Bernoulli, **Giovanni Venturi**, created a pump using this effect.

A restriction in a fluid line causes a pressure drop due to the velocity increase.

How the Venturi Pump Works:





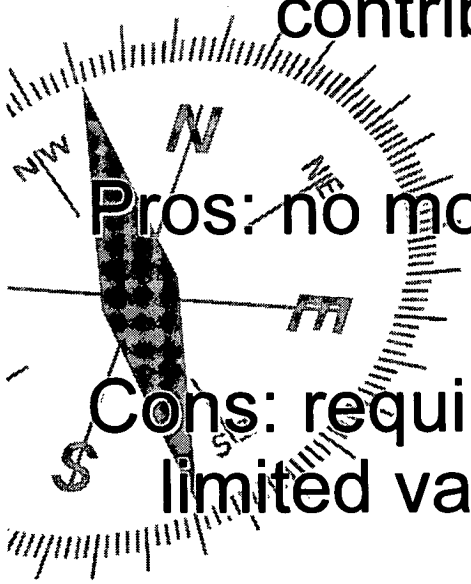


Venturi Pump Details

Vacuum Range: 50-500 Torr

Cost $75 -$200

- materials, integrated solenoids, vacuum contribute to cost



Pros: no moving parts, minimal maintenance

Cons: requires an external compressed air source, limited vacuum range

References

-Eric Weisstein's World of Physics
http://scienceworld.wolfram.com/physics/BernoillisLaw.html

-Vaccon Vacuum Products
http://www.vaccon.com/venturi.html